SDA 1043

BASS BASIN

REPORT TO GOVERNMENT

T/23P SEISMIC INTERPRETATION AND PERMIT EVALUATION

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JULY 1992

Keywords: Firetail, Thornbill, Eastern View, T/14P, Bass, Yurongi, Dondu

The Shell Company of Australia Limited

SUMMARY

Bass Basin permit T/23P was awarded to the Shell Company of Australia Limited (SCOA) on 22nd December, 1989. The permit is currently in Permit Year 3 and under the Modified Work Programme system, SCOA has the opportunity to renegotiate the terms of the Secondary Work Programme (Years 4-6) or it may withdraw at the end of Year 3 (21st December, 1992) providing the permit is in good standing.

This report is an assessment of the permit's prospectivity, based primarily upon new seismic evidence arising from the 1990 Shell BS90A survey. It is concluded that further exploration activity in T/23P is not justifiable. No drillable traps have been mapped. The Firetail Prospect and Thornbill Lead play concepts, proposed at the time of award of the permit, are no longer valid as the objective intervals are now thought to be unprospective.

On this basis, it is recommended that Shell relinquish T/23P before entering the drilling commitment year on 22nd December 1992. The permit would be relinquished in good standing with all of the Primary Work Programme commitments fulfilled.

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1. INTRODUCTION

The Bass Basin exploration permit T/23P was awarded to the Shell Company of Australia Limited (SCOA) (100%) on 22nd December, 1989. The permit lies in Bass Strait, some 250 km southeast of Melbourne (Fig. 1). T/23P was applied for in conjunction with a seismic farmin option to neighbouring T/14P (now vacant acreage) so as to secure the entire Bass High area, where the potential for a Kipper type play (Firetail Prospect, Fig. 2) was recognised. Potential development of alluvial fan sands along the downthrown southern margin of the Bass High represented a second possible play in T/23P (Thornbill Lead, Fig. 2).

The firm T/23P Work Programme requirement of 500 km seismic was fulfilled by the acquisition of the BS90A survey in 1990. The six year work programme is as follows:

Year Ending	Minimum Work Requirements	Indicative Expenditure	Status
21/12/90	400 km seismic	A$400,000	Fulfilled
21/12/91	Office Studies	A$100,000	Fulfilled
21/12/92	100 km seismic	A$150,000	Fulfilled
----------Decision Point - Continue in Permit? ----------			
21/12/93	Drill one well	A$8,000,000	-----
21/12/94	Office Studies	A$100,000	-----
21/12/95	100 km seismic	A$150,000	-----

The permit is currently in Year 3 and under the Modified Work Programme system, SCOA has the opportunity to renegotiate the terms of the Secondary Work Programme (Years 4-6) or it may withdraw at the end of Year 3 (21st December, 1992) providing the permit is in good standing.

Interpretation and evaluation of the T/23P seismic data was deferred in favour of more pressing priorities in other exploration permits. However, with a significant permit decision point to be reached at the end of 1992, (i.e. to enter Year 4 incurring a drilling commitment) the prospectivity evaluation was commenced in early 1992. This report summarises the results of the evaluation.

2. REGIONAL GEOLOGY

The Bass Basin formed during rifting in the Early Cretaceous associated with the separation of southern Australia and Antarctica. During this time the Otway Group was deposited on a basement of Paleozoic metasediments and granites (Fig. 3). Break-up of the southern margin of Australia to the west of Tasmania occurred in the mid-Cretaceous. The Bass Basin continued to undergo extension and subsidence until at least the Early Eocene (mid *M. diversus*, Fig. 3). During this time the Lower and Middle Eastern View Group was deposited. These units consist of non-marine upper coastal plain, lower coastal plain, delta front and lacustrine sediments. Subsidence continued through the Eocene with the deposition of the Upper Eastern View Group. The Lower, Middle and Upper Eastern View Group are defined by unconformities which developed on the flanks of the basin in response to localised movement and associated volcanic activity.

The first significant marine influence seen in the basin occurred during the Middle - Late Eocene. This transgression deposited the shallow marine sands at the top of the Eastern View Group which are overlain by marine silts and clays of the Demons Bluff Formation. Post-Eocene sediment starvation resulted in the deposition of calcareous shales during the Oligocene and limestones from the Miocene to Recent.

The overall structural evolution of the Bass Basin is quite straightforward; extension followed by thermal sag associated with the successful separation of Australia and Antarctica continued from the earliest Cretaceous to the Eocene. Apart from mild inversion of the Cormorant and Pelican Troughs (Fig. 4), wrenching during the Eocene produced only slight changes to the basin morphology. The major Eocene and Miocene age anticlines seen in the Gippsland Basin and Torquay Sub-basin are not present in the Bass Basin.

3. PLAY CONCEPTS

The primary objective in the Bass Basin is the transgressive sandstone at the top of the Eastern View Group sealed beneath the Demons Bluff Formation shales and siltstones. Existing mapping at the time of the T/23P application indicated that the only closures at this level in T/23P had been drilled by Dondu-1 and Yurongi-1 (Fig. 2) and that there was little further potential. Secondary objectives include intra-Eastern View Group sand/shale pairs. The Mid *M. diversus* Unconformity needed to be mapped to determine the potential for intra-Eastern View Group structures.

The application for Permit T/23P was based on several conceptual plays but without any recognised prospects. The principal concept behind the application was the continuation into the permit of the Bass High (Figs. 2, 4). Bass-2 was drilled in 1966 on this major high and reached its total depth in a sequence of volcanics, shales and siltstones which were, at the time of drilling, thought to directly overlie economic basement. Apart from minor shows in the Demons Bluff Formation, Bass-2 did not intersect any hydrocarbons. Palynological review of a sample from the base of Bass-2 (Macphail, 1987) indicated the section was likely to be Paleocene age and not economic basement. On this basis the possibility of Lower Eastern View Group sediments beneath the total depth of the well was proposed. Seismic across the Bass High appeared to show dipping events beneath the volcanics which were interpreted to be Lower Eastern View Group. Limited gravity modelling supported this concept . An analogy with the Kipper Play in the Gippsland Basin was invoked, whereby, the volcanics seen in the base of Bass-2 may act as a seal for unpenetrated fluvial sandstones of the underlying Lower Eastern View Group. A significant closure beneath Bass-2 was mapped at the time.

Subsequent mapping, incorporating the 1990 Shell seismic, of the Top Volcanics level confirmed the presence of a Firetail Prospect closure in T/14P, albeit smaller and more complex than previously mapped. However, the character of the section beneath the volcanics on the new seismic data lacked coherent reflections and was interpreted to be basement. A thin Middle Eastern View Group was interpreted to lie directly on basement and it was concluded that there was no prospective section beneath the total depth of Bass-2. It was therefore recommended that the farmin opportunity be declined. Similarly, the play has no potential in T/23P.

The second, more speculative, play proposed in T/23P was the alluvial fan play associated with the Thornbill Lead. Seismic line TQH-99 appears to have basinward dipping bright reflections on the downthrown side of the Bass High bounding fault which were thought to represent alluvial fan deposits. A speculative downthrown fault trap was recognised to the east of this line. The seismic acquired in T/23P in 1990 was also designed to evaluate this lead.

4. SEISMIC INTERPRETATION

The seismic interpretation of T/23P was completed in early 1992. An earlier interpretation in T/14P was extended to include all of the 1990 Shell data (BS90A) and 1985 Amoco data (TQH) in T/23P. The Landmark Interpretation Workstation was used for fault correlation.

4.1 Seismic Data

The 700 km BS90A survey was acquired over T/23P and T/14P by the HGS vessel, M.V. Pacific Titan, using a 35.7 litre airgun array and a 3750m, 300 channel, digital streamer (Fig. 5, Encl. 1). The shotpoint interval was 25m, with a group interval of 12.5m, producing 75 fold coverage. Processing of this data was performed by Digicon and included KF filtering, signature deconvolution, multiple suppression via the Hampson-Russel parabolic transform technique, DMO and Kirchoff Migration. In order to tie with the existing data, the 1990 data was displayed at 3.75 inches/sec and zero phase, SEG reverse polarity. The BS90A data was acquired perpendicular to the structural grain of the Bass-2 High (30^{o} to the TQH data). The average dip line spacing of the Shell data is 1.25 km, whilst for the TQH data, it is 3 km.

4.2 Correlation

The well - seismic ties used in this interpretation included wells from across the entire Bass Basin (SDA 959). In T/23P, five horizons were correlated (Encl. 2, 3). Two intra-Torquay Group events which correspond with significant lithology related velocity changes were mapped, along with the Top Demons Bluff Formation (strong white loop) and Top Eastern View Group (strong, laterally consistent, black loop). The Mid *M. diversus* Unconformity, which has subtle angularity on the Bass High, is normally a strong black loop. It marks the base of the reflective Upper Eastern View Group package. Basinward from the Bass High a more complete Eastern View Group section is present and hence this event becomes conformable.

A fault bound ramp is mapped plunging southwards from the Bass High. On this ramp is the 'Deep Pink Event', an unconformity which was mapped as part of the T/14P

evaluation. It corresponds to the proposed objective at the Thornbill Lead, the so-called "top Lower Eastern View Formation" event mapped in SDA 799.

4.3 Depth Conversion

Hand contoured time structure maps were made for all of the horizons interpreted (Encl. 4, 5, 6, 7, 8). Interval velocity fields for each of the major intervals were derived using stacking velocities calibrated against Bass-2, Yurongi-1, Dondu-1 and Nangkero-1. The time structure maps were then depth converted using the calibrated interval velocity fields.There are no steeply dipping velocity interfaces in the shallow section so there is not expected to be any mispositioning due to ray-bending. Depth maps of the Top Eastern View Group and Mid *M. diversus* Unconformity levels are shown in Enclosures 9, 10.

4.4 Structural Interpretation

The T/14P and T/23P region of the Bass Basin is adjacent to the northeastern basin bounding fault (Figs. 2, 4). The structural style of the region is complex. The Bass High is a tilted fault block with an adjacent half graben against the basin bounding fault. To the SW of the Bass High is the Bass Basin Deep. A fault bound terrace plunges southwards from the Bass High which is bound to the east by a major normal fault which throws down to the NE, opposite to the sense of throw on the Bass High faults. A reversed half graben is developed along the hanging wall of this fault (Fig. 2). The transition from SW to NE downthrow on the fault system can be traced from line to line and seems to exclude the existence of a transfer fault in this location, as has been suggested by Etheridge, et al. (1985).

The Landmark Workstation was used to correlate the fault traces from one section to the next. This allowed a greater degree of confidence in the interpreted fault pattern. The structural style of the T/23P area consists of 2 main fault trends; WNW-ESE, subparallel to the Bass High bounding faults, and NNW-SSE, subparallel to the terrace bounding faults. In places, the NNW-SSE fault set appear to displace the other set and hence may be younger. The different trends may be due to slight changes in the direction of the basinal stress regime through time, associated with the movement of Tasmania relative to Australia (Young, et al., 1991).

5. PROSPECTIVITY

Neither of the two plays that were the basis for the T/23P application are still considered valid as a result of the current mapping.

The Firetail Prospect does not have a prospective reservoir objective. The previously postulated Lower Eastern View Group at Firetail is now interpreted to be basement (Section 3.). The seismic character of the reflections corresponding to the "alluvial fan sands" of the Thornbill Lead is remarkably similar to that of the Strzelecki Group along the northern margin of the Gippsland Basin. This sequence is believed to be its equivalent i.e. the unprospective Eumeralla Formation of the Otway Group (Encl. 3). Any remaining prospectivity within T/23P, therefore, relies on closures at known reservoir objective levels. Mapping of seismic in T/23P has failed to locate any new structures that can be considered prospective. The Top Eastern View Group and Mid *M. diversus* Unconformity depth maps show that the only closures of any potential have already been drilled (Encl. 9, 10). Both Dondu-1 and Yurongi-1 were drilled within

closure on downthrown fault traps. They were drilled downdip from the culminations, however, the updip potential of each structure is quite small. The lack of hydrocarbons in these wells significantly downgrades the prospectivity of downthrown fault traps in this area. The only new closures mapped in T/23P are downthrown fault traps against the basin bounding fault. This play has an unacceptably high risk of failure due to juxtaposition of downthrown objective sands against probably quite sandy Eastern View Group on the upthrown block, which would severely limit both across-fault and clay smear sealing potential.

Localised mapping of deeper events which have two-way rollover failed to locate any closures.

6. CONCLUSIONS AND RECOMMENDATIONS

The conclusion of this study is that no further work should be undertaken in T/23P. There are no drillable Top Eastern View Group or Mid *M. diversus* Unconformity traps, nor were any deeper intra-Eastern View Group structures mapped. The Thornbill Lead no longer exists; its objective is now thought to be unprospective Eumeralla Formation.

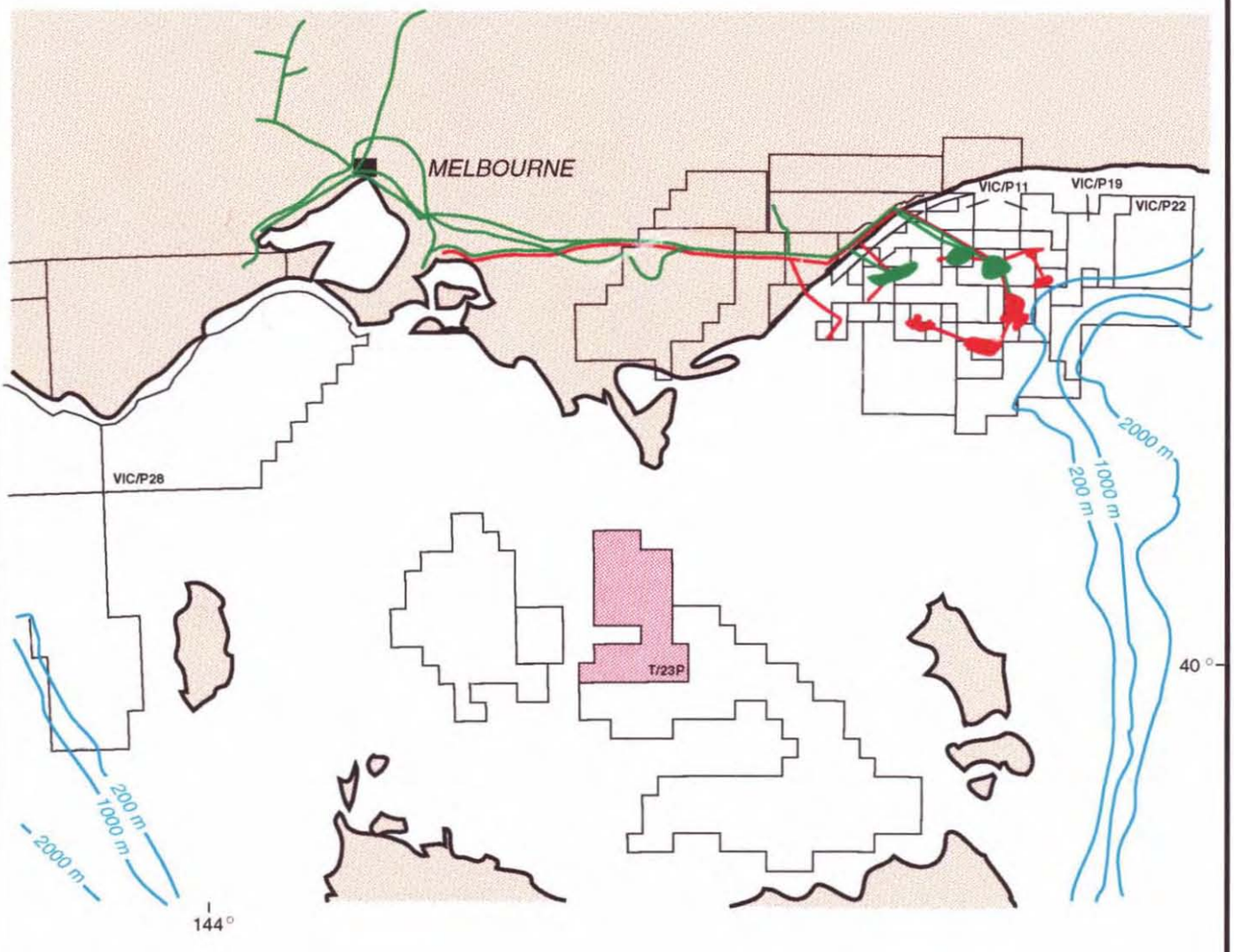
On this basis, it is recommended that Shell relinquish T/23P before entering the drilling commitment year on 22nd December 1992. The permit would be relinquished in good standing with all of the Primary Work Programme commitments fulfilled.

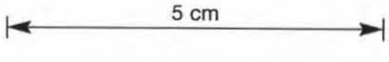
7. REFERENCES

Etheridge, M.A., Branson, J.C., Stuart-Smith, P.G.,1985: Extensional Basin-Forming Structures in Bass Strait and their Importance for Hydrocarbon Exploration., in The APEA Journal, p. 344-361.

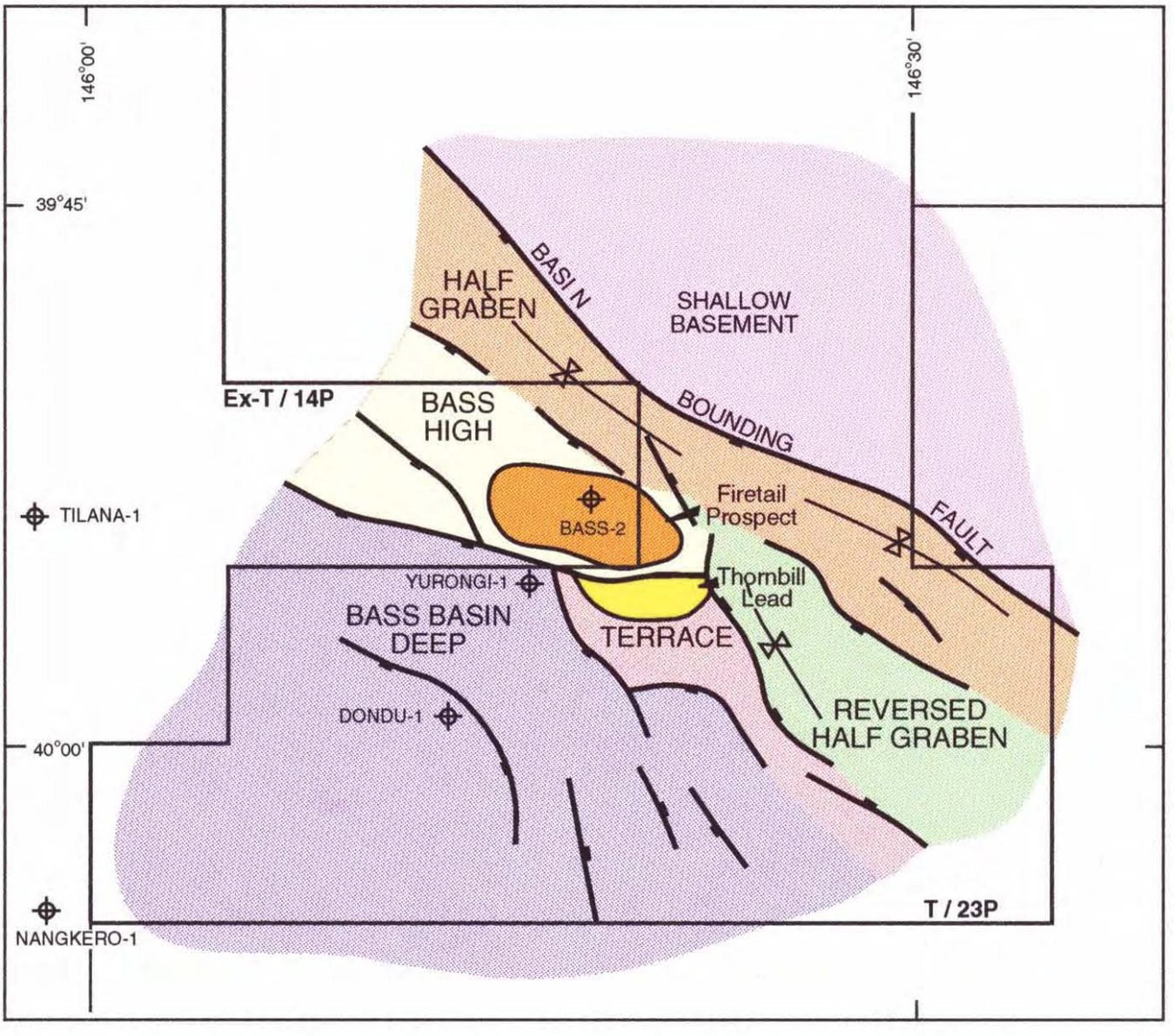
Macphail, M.K., 1987: Palynological Analyses of Cuttings Samples from Near Total Depth, Bass-2, Bass Basin., (R6623).

Young, I.M., Trupp, M.A., Gidding, M.J., 1991: Tectonic Evolution of Bass Strait - Origins of Tertiary Evolution., in Exploration Geophysics, vol. 22, p. 465-468.





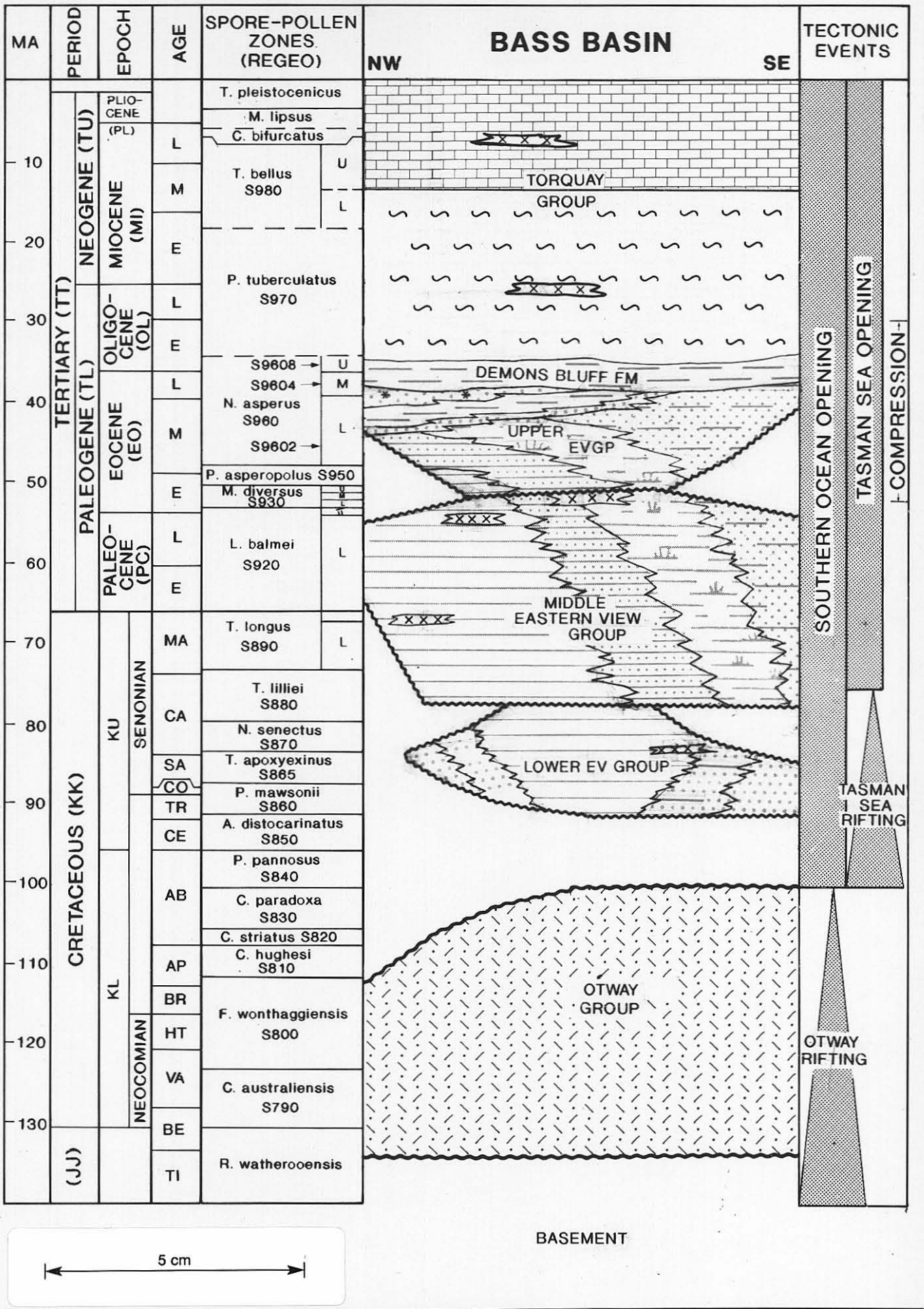
SHELL- AUSTRALIA E.& P. OIL & GAS	BASS BASIN				Figure
	T/23P PERMIT LOCATION MAP				1
	Author: EXO	Report No.: SDA 1043	Date: MARCH 1992	Drawing No.: 27752 C	



5 cm

SHELL - AUSTRALIA E.& P. OIL & GAS	BASS BASIN **T / 23P TECTONIC ELEMENTS**				Figure 2
	Author: EXO	Report No.: SDA 1043	Date: MARCH 1992	Drawing No.: 27748 C	

248013



SHELL-AUSTRALIA
E.& P. OIL AND GAS

BASS BASIN

STRATIGRAPHY

Figure 3

Author: EXO | Report No.. SDA 1043 | Date: JUNE 1990 | Drawing No.: 26220

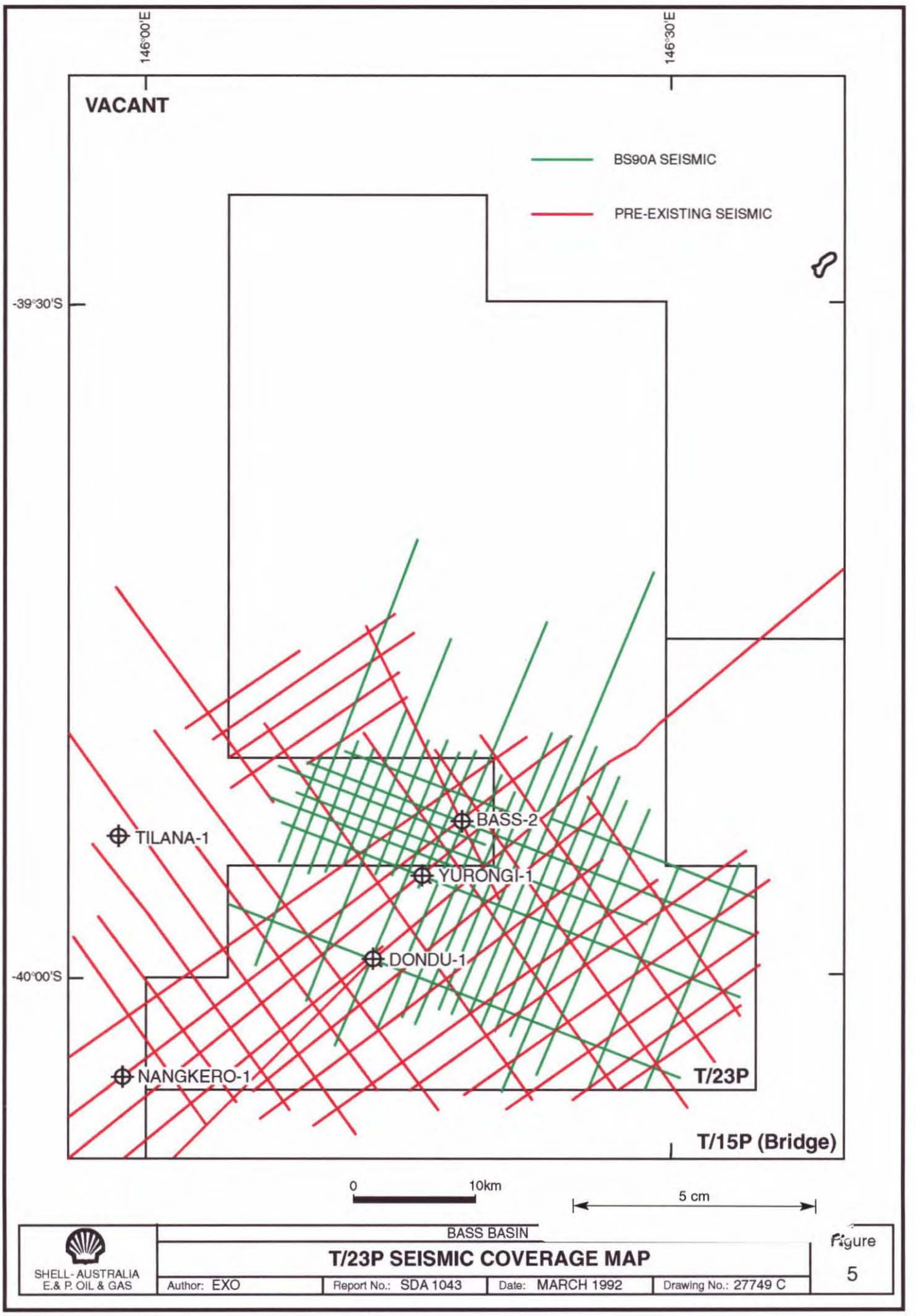
248014

VIC/P28
SNAIL-1
TORQUAY SUB-BASIN
KING ISLAND-MORNINGTON PENINSULA HIGH
VIC/P25
GROPER-1
GROPER-2
GIPPSLAND BASIN
VICTORIA
TASMANIA
MULLET-1
KONKON-1
CORMORANT TROUGH
SEAL-1
T/18P
TOOLKA-1
CORMORANT-1
KOORKAH-1
BLUEBONE-1
T/23P
BASSIAN RISE
SHALLOW BASS HIGH BASEMENT
BASS-1
AROO-1
YOLLA-1
BASS-2
T/15P
TILANA-1
YURONGI-1
DONDU-1
BASS-3
TRL1
NANGKERO-1
TAROOK-1
STRUCTURAL TREND
T/25P
PELICAN TROUGH
POON BOON-1
CHAT-1
SQUID-1
THIN EVGP.
SHALLOW BASEMENT
PELICAN-3
NARIMBA-1
PELICAN-2
PELICAN-1
PELICAN-5
PELICAN-4
PIPIPA-1
DURROON EMBAYMENT
SHALLOW BASEMENT
KING ISLAND HIGH
DURROON-1
FLINDERS ISLAND HIGH
TASMANIAN DEVIL-1
SHALLOW BASEMENT
SORELL BASIN
5 cm
N
0 40 km

SHELL-AUSTRALIA E.& P. OIL AND GAS
BASS BASIN

TECTONIC ELEMANTS

Author: EXO	Date: JULY 1990	FIG.4
Report No.: SDA 1043	Drawing No.: 24849	



SHELL - AUSTRALIA
E.& P. OIL & GAS

BASS BASIN

T/23P SEISMIC COVERAGE MAP

Figure 5

Author: EXO	Report No.: SDA 1043	Date: MARCH 1992	Drawing No.: 27749 C

VACANT
(Ex-T/14P)

T/23P

TILRNA-1

NRANGKERO-1

TURONG1-1

KONDU-1

BS90A-23

BS90A-33

BHR-40

BC581-1B

BC581-2

0 5 10km

FOR LINE BS90A-23 SEE ENCLOSURE 2
FOR LINE BS90A-33 SEE ENCLOSURE 3

5 cm

SHELL-AUSTRALIA E.& P. OIL AND GAS

BASS BASIN

SHOT POINT
LOCATION MAP

245016

Author : EXO	Date : MARCH 1992	Encl. 1
Report No. : SDA 1043	Drawing No. : 27764	

TPR 92-0247

202.5 DEG

SHELL COMPANY OF AUSTRALIA

LINE : BS90A-23

S P : 1001-1879

AREA : BASS STRAIT

PERMIT : T/14P

MIGRATION

ZERO PHASE REFLECTIVITY

TIME SECTION

RECORDING PARAMETERS

RECORDED BY : HALLIBURTON GEOPHYSICAL SERVICES
VESSEL : M.V. PACIFIC TITAN
DATE RECORDED : 1 MARCH 1990
SHOOTING DIRN : 202.5 DEG

RECORDING INSTRUMENTS

INSTRUMENTS : FIELD COMPUTER SYSTEM III
FIELD FILTER : HI - 128 HZ 72 DB/OCT
LO - 8.0 HZ 18 DB/OCT
SAMPLE RATE : 2 MSEC.
RECORD LENGTH : 6 SEC.
TAPE FORMAT : SEG D 6250BPI

NAVIGATION

PRIMARY : ARGO

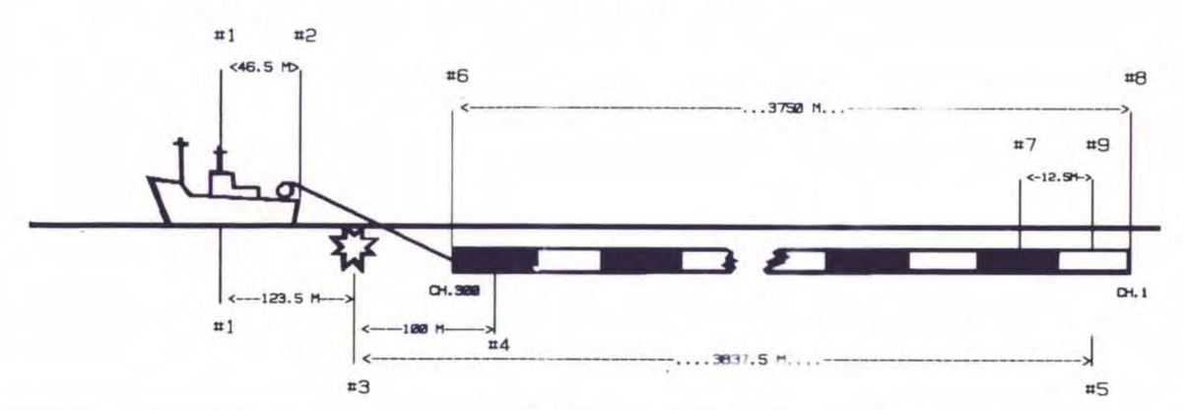
SOURCE

ENERGY SOURCE : AIRGUN
ARRAY VOLUME : 2180 CU.IN.
AIRGUN PRESSURE : 1850 PSI.
GUN DEPTH : 6.5 M.
SHOTPOINT INTERVAL : 25 M.

STREAMER

NO. OF GROUPS : 300 CHANNEL
STREAMER LENGTH : 3750 M.
NEAR OFFSET : 100 M.
FAR OFFSET : 3837.5 M
AVE. STREAMER DEPTH : 8 M.
GROUP INTERVAL : 12.5 M.

#1 - #2 : CENTRAL NAVIGATION POINT TO STERN OF VESSEL.
#1 - #3 : C.N.P. TO CENTRE OF AIRGUN ARRAY.
#3 - #4 : CENTRE OF AIRGUN ARRAY TO CENTRE OF NEAR GROUP (NEAR OFFSET).
#3 - #5 : CENTRE OF AIRGUN ARRAY TO CENTRE OF FAR GROUP (FAR OFFSET).
#6 - #8 : STREAMER BEGINNING TO STREAMER END (CABLE LENGTH).
#7 - #9 : CENTRE TO CENTRE OF ADJACENT HYDROPHONE GROUPS (GROUP INTERVAL).



PROCESSING SEQUENCE

[1] TRANSCRIPTION
SEG-D FIELD TAPE COPIES TO DIGICON INTERNAL FORMAT
DATA LENGTH........... 5 SEC.
SAMPLE RATE........... 2 MSEC.

[2] RESAMPLE
2 MS TO 4 MS MINIMUM PHASE ANTI-ALIAS FILTER
BUTTERWORTH 0 - 110 HZ.

[3] STATIC CORRECTIONS
-41.5 MSEC. SOURCE/CABLE CORRECTION

[4] EDIT

[5] VELOCITY FILTER:- [FILTKF]
SHOT DOMAIN WITH RECOVERABLE AGC (400MSEC. GATE)
PASS RANGE : -1.75 KM/SEC . +1.75 KM/SEC

[6] 2:1 ADJACENT TRACE SUM
APPLICATION WITH DIFFERENTIAL NMO

[7] SPHERICAL DIVERGENCE CORRECTION
SCALAR V.T. USING REPRESENTATIVE VELOCITY FUNCTION

[8] SIGNATURE DECONVOLUTION:- [DEFLAT]
OUTPUT ZERO PHASE WAVELET (8 - 90 HZ)
DESIGN GATES : NEAR OFFSET 0-4100MSEC. FAR OFFSET 2900-4500MSEC.
APPLICATION GATE : ON FULL TRACE

[9] PRE-STACK TRACE EQUALIZATION
GATES : NEAR 250 - 3500 MSEC.
FAR 2500 - 4500 MSEC.

[10] C.D.P. GATHER
MAXIMUM FOLD : 75

[11] VELOCITY ANALYSIS :- FIRST PASS
4.0 KM. INTERVALS USING DIGICONS "VELFAN" ROUTINE

[12] MULTIPLE SUPPRESSION [PMULT]
PARABOLIC TRANSFORM TECHNIQUE "PMULT"
USING 90% OF 1ST PASS VELOCITY FIELD
DERIVED FROM STEP [11]

[13] DIP MOVEOUT COMPENSATION :- K-F METHOD

[14] GAIN CORRECTION
EXPONENTIAL +18 DB OVER 0.3 - 3.3 SEC.

[15] VELOCITY ANALYSIS :- 2ND PASS
1.5 KM. INTERVALS USING DIGICONS "VELFAN" ROUTINE
VELOCITY Q.C. BY CLIENT REPRESENTATIVE

[16] N.M.O. CORRECTION
USING 2ND PASS VELOCITY FIELD
VELOCITIES AS ANNOTATED ABOVE SECTION

[17] DECONVOLUTION
TYPE : PREDICTIVE
OPERATOR LENGTH = 360 MS. GAP LENGTH = 48 MSEC.
WHITE NOISE ADDED : 0.1%
DESIGN GATES : NEAR 150 TO 2800 MSEC. FAR 2800 TO 4700 MSEC.
APPLICATION GATES: 0 TO 5000 MSEC. 0 TO 5000 MSEC.

[18] PRE-STACK TRACE MUTES

OFFSET (M.)	125	550	3850
TIME (MSEC.)	20	300	2800

[19] COMMON DEPTH POINT STACK

[20] BANDPASS FILTER

TIME (SEC.)	PASSBAND/SLOPE (DB/OCT)
0.00 - 1.00	8/18 - 75/72
2.00	8/18 - 65/72
3.00	8/18 - 55/72
5.00	8/18 - 50/72

[21] MIGRATION
TYPE : KIRCHHOFF ALGORITHM
SMOOTHED STACK VELOCITIES USED

DISPLAY PARAMETERS

[22] TRACE EQUALIZATION

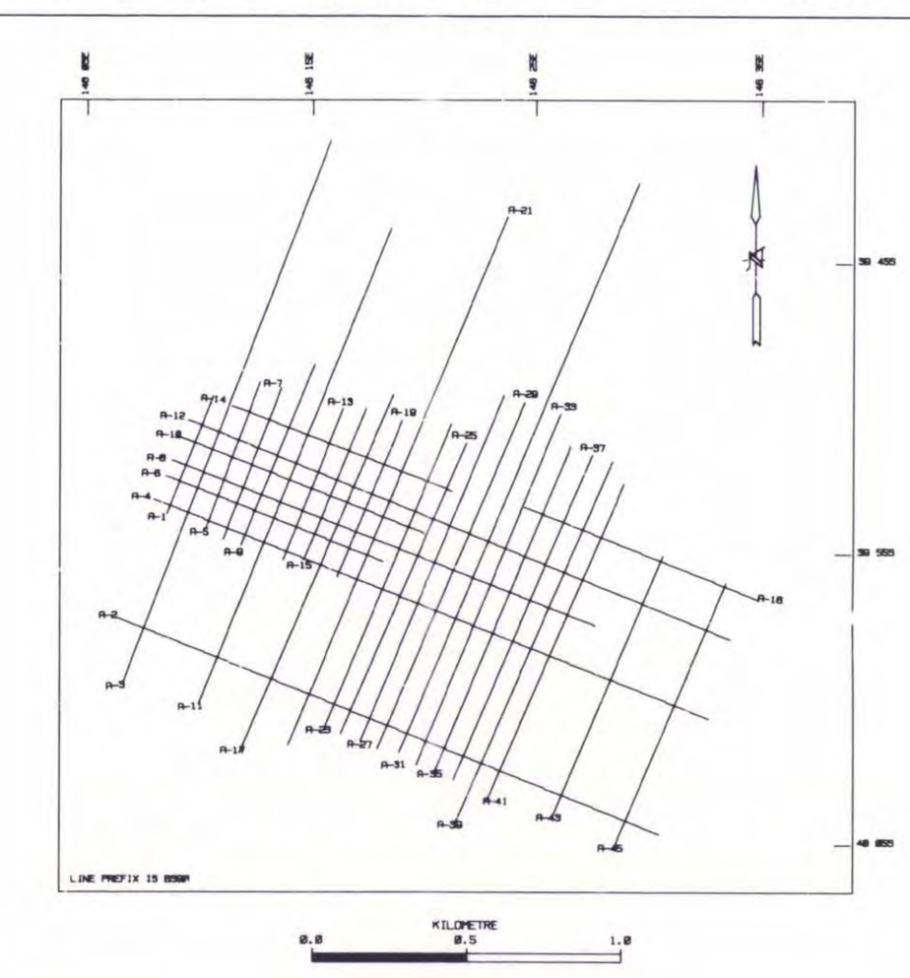
GATE TIME START (MSEC.)	GATE TIME END (MSEC.)
100	600
500	1000
900	1500
1400	1900
1800	2300
2200	2700
2600	3100
3000	3500
3400	3900
3800	4300
4200	4700

HORIZONTAL SCALE : 50.8 T.P.I. [1:25,000]

VERTICAL SCALE : 3.75 IN./SEC.

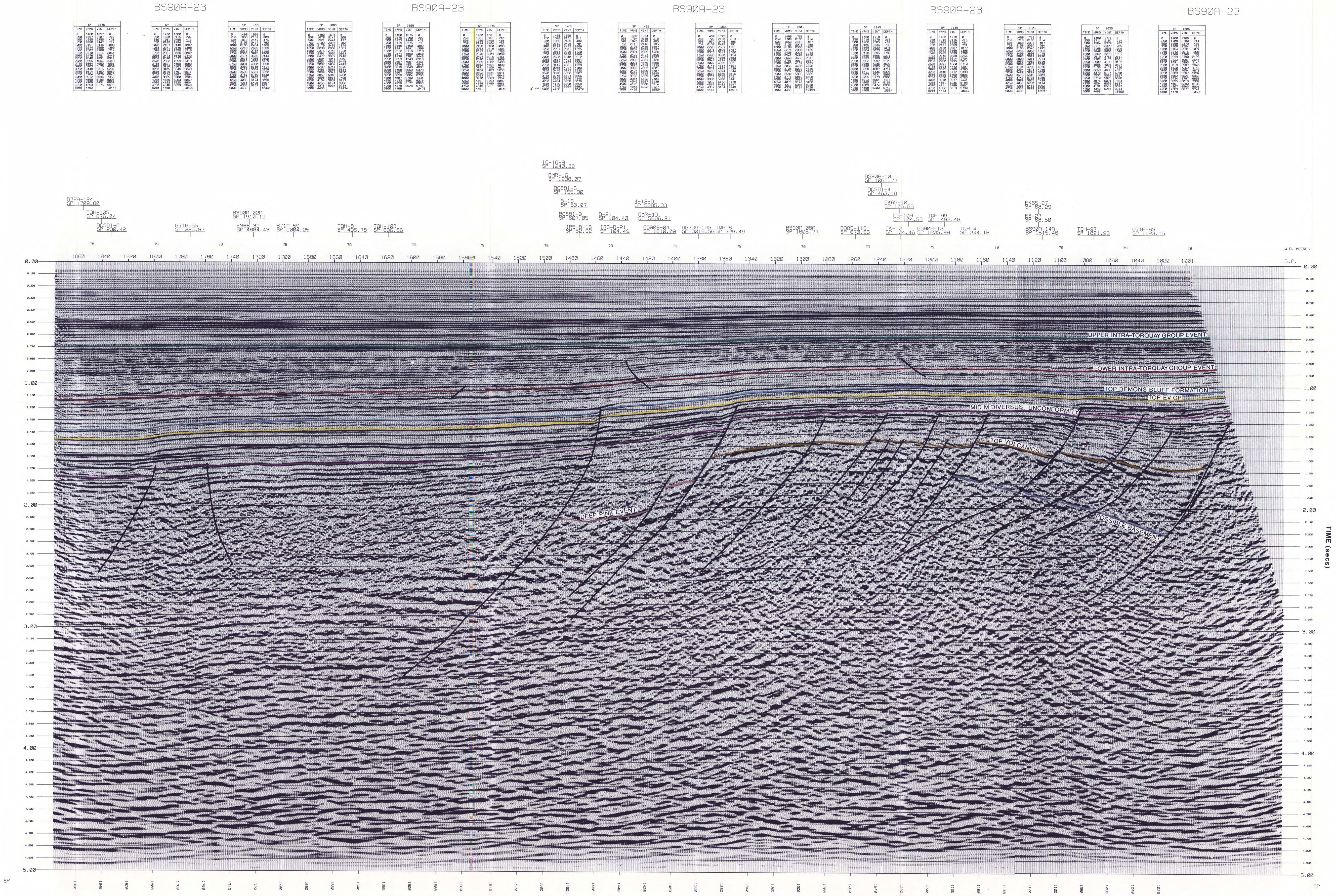
POLARITY

RECORDED : COMPRESSION RECORDED AS -IVE NUMBER ON TAPE
DISPLAYED : TAPE POLARITY REVERSED ON DISPLAY WITH A COMPRESSION REPRESENTED BY A BLACK PEAK.
DATUM : SEA LEVEL
SHOT ANNOTATION : SHOTPOINTS ANNOTATED AT CENTRE OF SOURCE ARRAY



PROCESSED BY : DIGITAL EXPLORATION LTD.
DIGICON. BRISBANE

PROCESSOR : G. HIGGS
Q.C. : S. KHAN
DATE : 12 APRIL 1990



VERTICAL SCALE 3.75"/sec

HORIZONTAL SCALE 1:25000

FOR LOCATION SEE ENCL.1

5 cm

248017

SHELL-AUSTRALIA E.& P. OIL AND GAS

BASS BASIN

INTERPRETED SEISMIC
LINE BS90A-23

Author : EXO	Date : JUNE 1990	Encl. 2
Report No. : SDA 1043	Drawing No. : 26192	

TPR OR-0247

26192

10 858458

Ø22.2 DEG

SHELL COMPANY OF AUSTRALIA

LINE : BS9ØA-33

S P : 1ØØ1-2ØØ7

AREA : BASS STRAIT

PERMIT : T/14P

MIGRATION

ZERO PHASE REFLECTIVITY

TIME SECTION

RECORDING PARAMETERS

RECORDED BY : HALLIBURTON GEOPHYSICAL SERVICES
VESSEL : M.V. PACIFIC TITAN
DATE RECORDED : 2 MARCH 199Ø
SHOOTING DIRN : Ø22.2 DEG

RECORDING INSTRUMENTS

INSTRUMENTS : FIELD COMPUTER SYSTEM III
FIELD FILTER : HI - 128 HZ 72 DB/OCT
LO - 8.Ø HZ 18 DB/OCT
SAMPLE RATE : 2 MSEC.
RECORD LENGTH : 6 SEC.
TAPE FORMAT : SEG D 625ØBPI

NAVIGATION

PRIMARY : ARGO

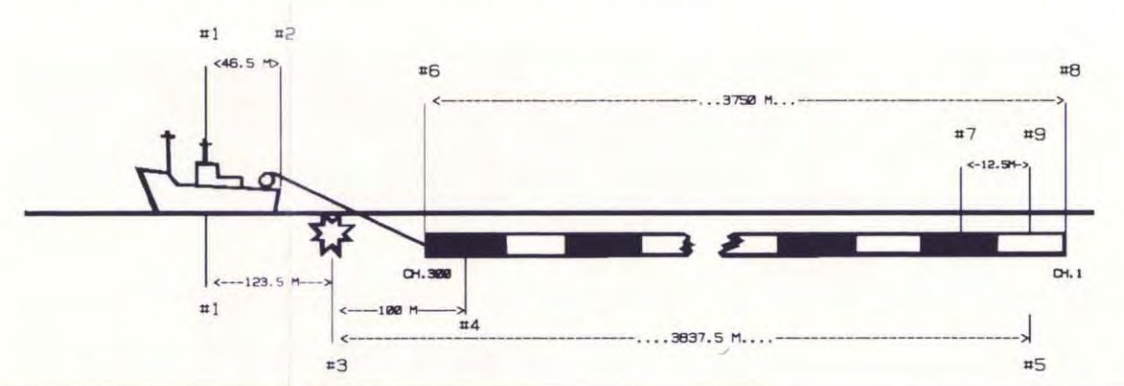
SOURCE

ENERGY SOURCE : AIRGUN
ARRAY VOLUME : 218Ø CU.IN.
AIRGUN PRESSURE : 185Ø PSI.
GUN DEPTH : 6.5 M.
SHOTPOINT INTERVAL : 25 M.

STREAMER

NO. OF GROUPS : 3ØØ CHANNEL
STREAMER LENGTH : 375Ø M.
NEAR OFFSET : 1ØØ M.
FAR OFFSET : 3837.5 M.
AVE. STREAMER DEPTH : 8 M.
GROUP INTERVAL : 12.5 M.

#1 - #2 : CENTRAL NAVIGATION POINT TO STERN OF VESSEL.
#1 - #3 : C.N.P. TO CENTRE OF AIRGUN ARRAY.
#3 - #4 : CENTRE OF AIRGUN ARRAY TO CENTRE OF NEAR GROUP (NEAR OFFSET).
#3 - #5 : CENTRE OF AIRGUN ARRAY TO CENTRE OF FAR GROUP (FAR OFFSET).
#6 - #8 : STREAMER BEGINNING TO STREAMER END (CABLE LENGTH).
#7 - #9 : CENTRE TO CENTRE OF ADJACENT HYDROPHONE GROUPS (GROUP INTERVAL).



PROCESSING SEQUENCE

[1] TRANSCRIPTION
SEG-D FIELD TAPE COPIES TO DIGICON INTERNAL FORMAT
DATA LENGTH........... 5 SEC.
SAMPLE RATE........... 2 MSEC.

[2] RESAMPLE
2 MS TO 4 MS MINIMUM PHASE ANTI-ALIAS FILTER
BUTTERWORTH Ø - 11Ø HZ.

[3] STATIC CORRECTIONS
-41.5 MSEC. SOURCE/CABLE CORRECTION

[4] EDIT

[5] VELOCITY FILTER:- [FILTKF]
SHOT DOMAIN WITH RECOVERABLE AGC (4ØØMSEC. GATE)
PASS RANGE : -1.75 KM/SEC , +1.75 KM/SEC

[6] 2:1 ADJACENT TRACE SUM
APPLICATION WITH DIFFERENTIAL NMO

[7] SPHERICAL DIVERGENCE CORRECTION
SCALAR V.T. USING REPRESENTATIVE VELOCITY FUNCTION

[8] SIGNATURE DECONVOLUTION:- [DEFLAT]
OUTPUT ZERO PHASE WAVELET (8 - 9Ø HZ)
DESIGN GATES : NEAR OFFSET Ø-41ØØMSEC. FAR OFFSET 29ØØ-45ØØMSEC.
APPLICATION GATE : ON FULL TRACE

[9] PRE-STACK TRACE EQUALIZATION
GATES : NEAR 25Ø - 35ØØ MSEC.
FAR 25ØØ - 45ØØ MSEC.

[1Ø] C.D.P. GATHER
MAXIMUM FOLD : 75

[11] VELOCITY ANALYSIS :- FIRST PASS
4.Ø KM. INTERVALS USING DIGICONS "VELFAN" ROUTINE

[12] MULTIPLE SUPPRESSION [PMULT]
PARABOLIC TRANSFORM TECHNIQUE "PMULT"
USING 9Ø% OF 1ST PASS VELOCITY FIELD
DERIVED FROM STEP [11]

[13] DIP MOVEOUT COMPENSATION :- K-F METHOD

[14] GAIN CORRECTION
EXPONENTIAL +18 DB OVER Ø.3 - 3.3 SEC.

[15] VELOCITY ANALYSIS :- 2ND PASS
1.5 KM. INTERVALS USING DIGICONS "VELFAN" ROUTINE
VELOCITY Q.C. BY CLIENT REPRESENTATIVE

[16] N.M.O. CORRECTION
USING 2ND PASS VELOCITY FIELD
VELOCITIES AS ANNOTATED ABOVE SECTION

[17] DECONVOLUTION
TYPE : PREDICTIVE
OPERATOR LENGTH = 36Ø MS. GAP LENGTH = 48 MSEC.
WHITE NOISE ADDED : Ø.1%
DESIGN GATES : NEAR 15Ø TO 28ØØ MSEC. FAR 28ØØ TO 47ØØ MSEC.
APPLICATION GATES: Ø TO 5ØØØ MSEC. Ø TO 5ØØØ MSEC.

[18] PRE-STACK TRACE MUTES

OFFSET (M.)	125	55Ø	385Ø
TIME (MSEC.)	2Ø	3ØØ	28ØØ

[19] COMMON DEPTH POINT STACK

[2Ø] BANDPASS FILTER

TIME (SEC.)		PASSBAND/SLOPE (DB/OCT)
Ø.ØØ	1.ØØ	8/18 - 75/72
2.ØØ		8/18 - 65/72
3.ØØ		8/18 - 55/72
5.ØØ		8/18 - 5Ø/72

[21] MIGRATION
TYPE : KIRCHHOFF ALGORITHM
SMOOTHED STACK VELOCITIES USED

DISPLAY PARAMETERS

[22] TRACE EQUALIZATION

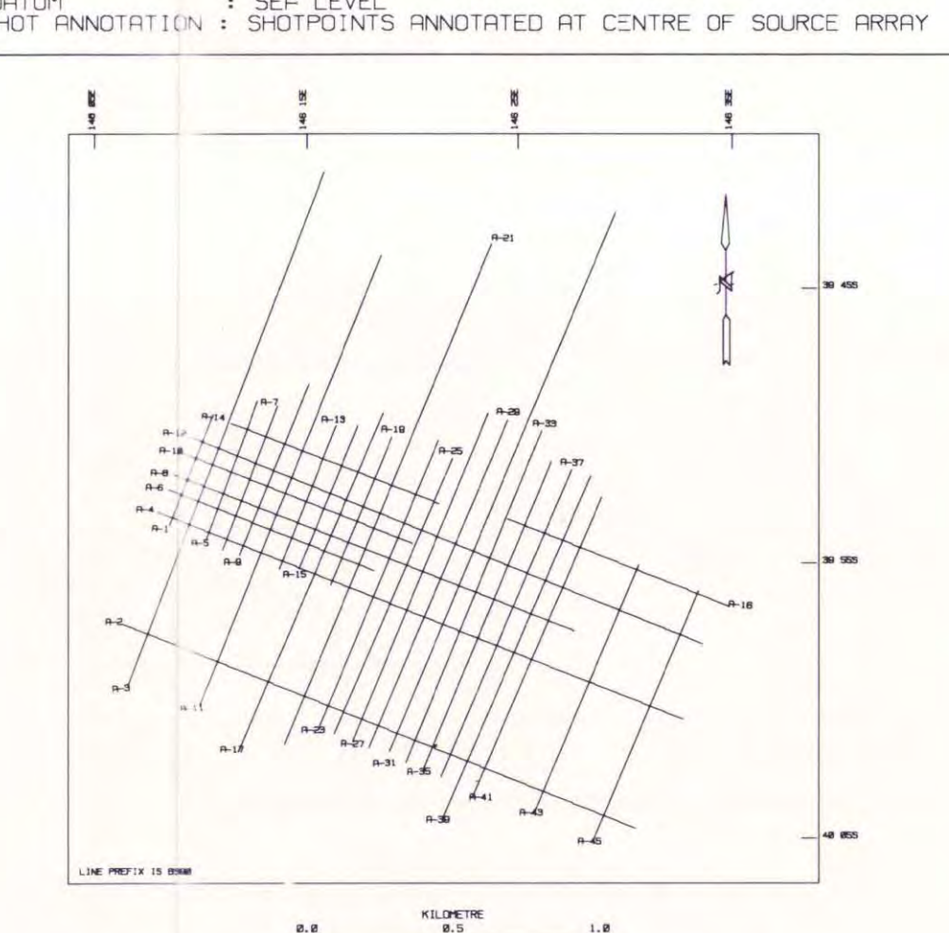
GATE TIME START (MSEC.)	GATE TIME END (MSEC.)
1ØØ	6ØØ
5ØØ	1ØØØ
9ØØ	15ØØ
14ØØ	19ØØ
18ØØ	23ØØ
22ØØ	27ØØ
26ØØ	31ØØ
3ØØØ	35ØØ
34ØØ	39ØØ
38ØØ	43ØØ
42ØØ	47ØØ

HORIZONTAL SCALE : 5Ø.8 T.P.I. [1:25.ØØØ]

VERTICAL SCALE : 3.75 IN./SEC.

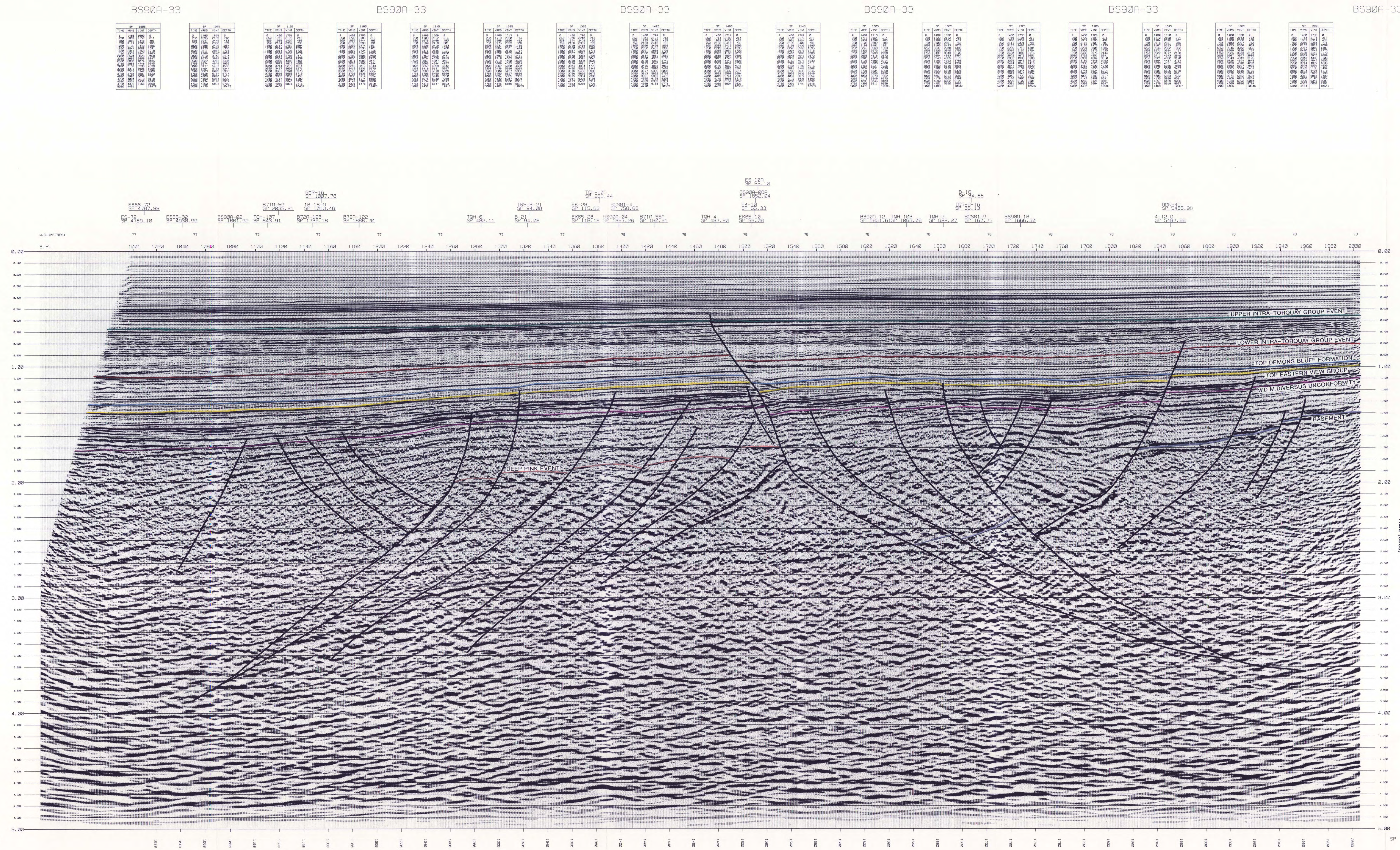
POLARITY

RECORDED : COMPRESSION RECORDED AS -IVE NUMBER ON TAPE
DISPLAYED : TAPE POLARITY REVERSED ON DISPLAY WITH A COMPRESSION REPRESENTED BY A BLACK PEAK.
DATUM : SEA LEVEL
SHOT ANNOTATION : SHOTPOINTS ANNOTATED AT CENTRE OF SOURCE ARRAY



PROCESSED BY : DIGITAL EXPLORATION LTD.
DIGICON, BRISBANE

PROCESSOR : CR HIGGS
Q.C. : S. KHAN
DATE : 18 APRIL 199Ø



VERTICAL SCALE 3.75"/sec

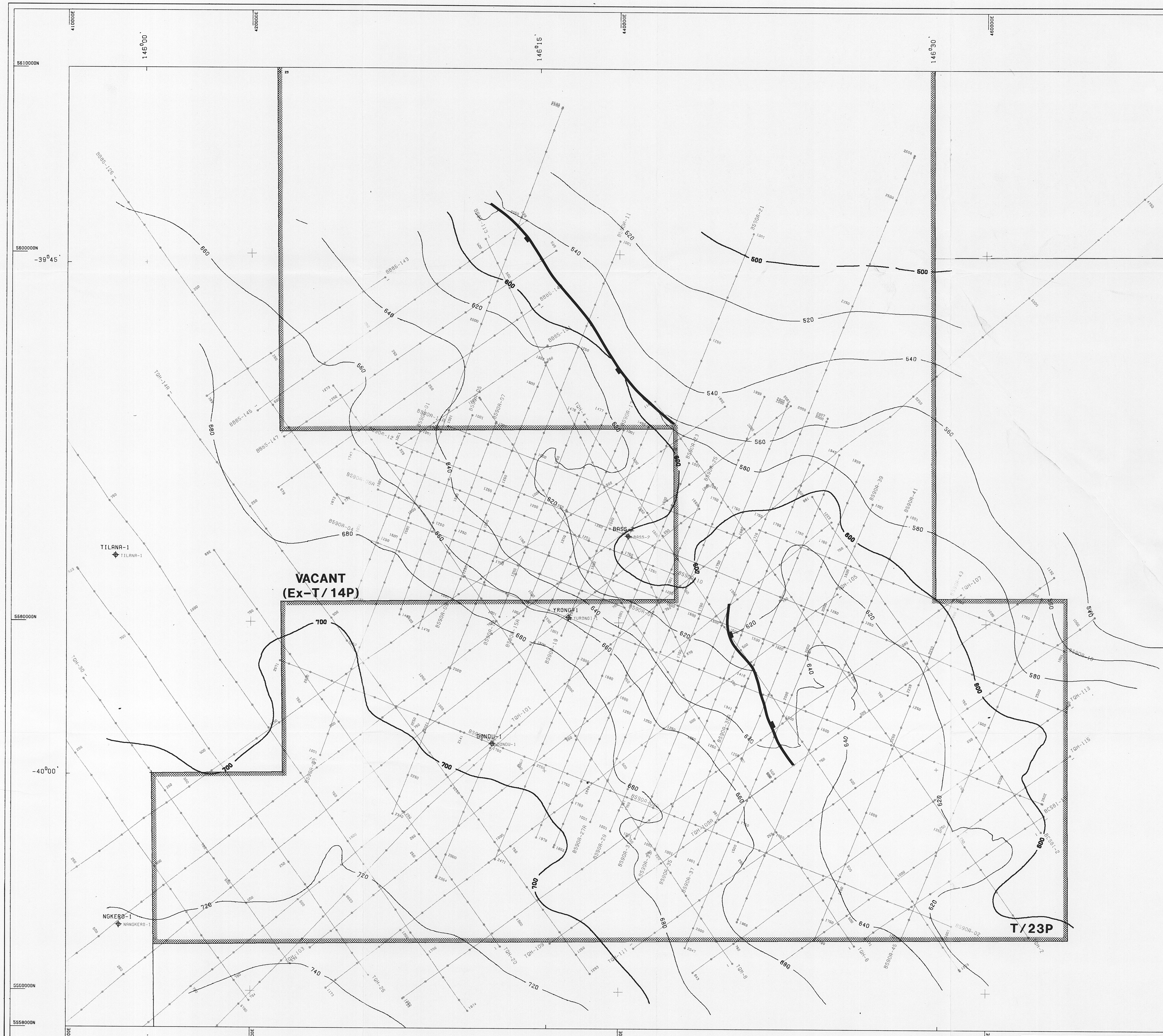
HORIZONTAL SCALE 1:25000

FOR LOCATION SEE ENCL.1

5 cm

SHELL-AUSTRALIA E.& P. OIL AND GAS		
BASS BASIN 248018		
INTERPRETED SEISMIC LINE BS90A-33		
Author : EXO	Date : APRIL 1992	Encl. 3
Report No. : SDA 1043	Drawing No. : 27788	

TPR OR-0247



5 cm

0 5 10km

C.I.=20ms

SHELL-AUSTRALIA E.&P. OIL AND GAS

BASS BASIN

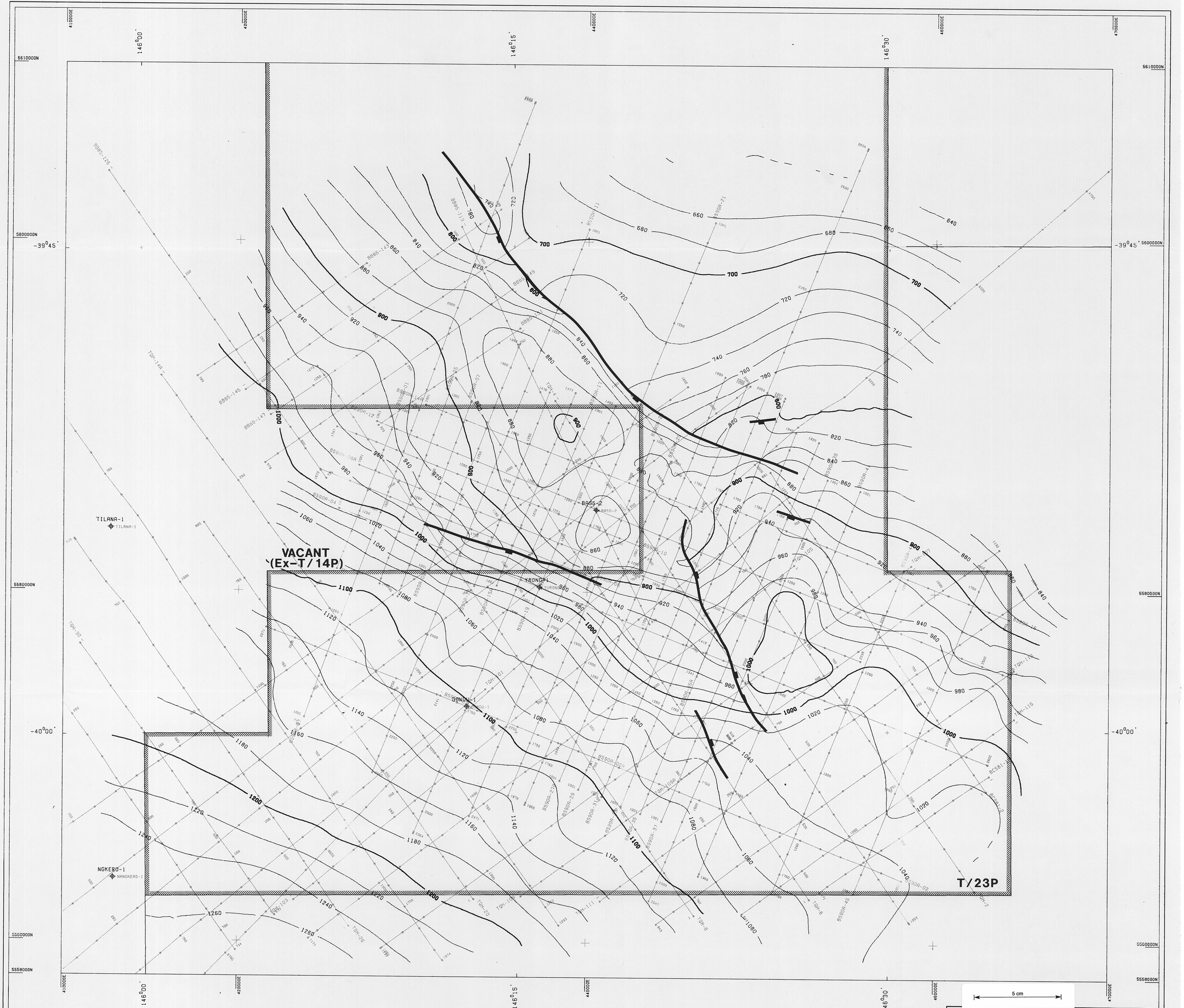
248019

UPPER INTRA-TORQUAY GROUP EVENT

TIME STRUCTURE MAP

Author : EXO	Date : MARCH 1992	Encl. 4
Report No. : SDA 1043	Drawing No. : 27754	

TR OR_0297



SHELL-AUSTRALIA E.& P. OIL AND GAS

BASS BASIN

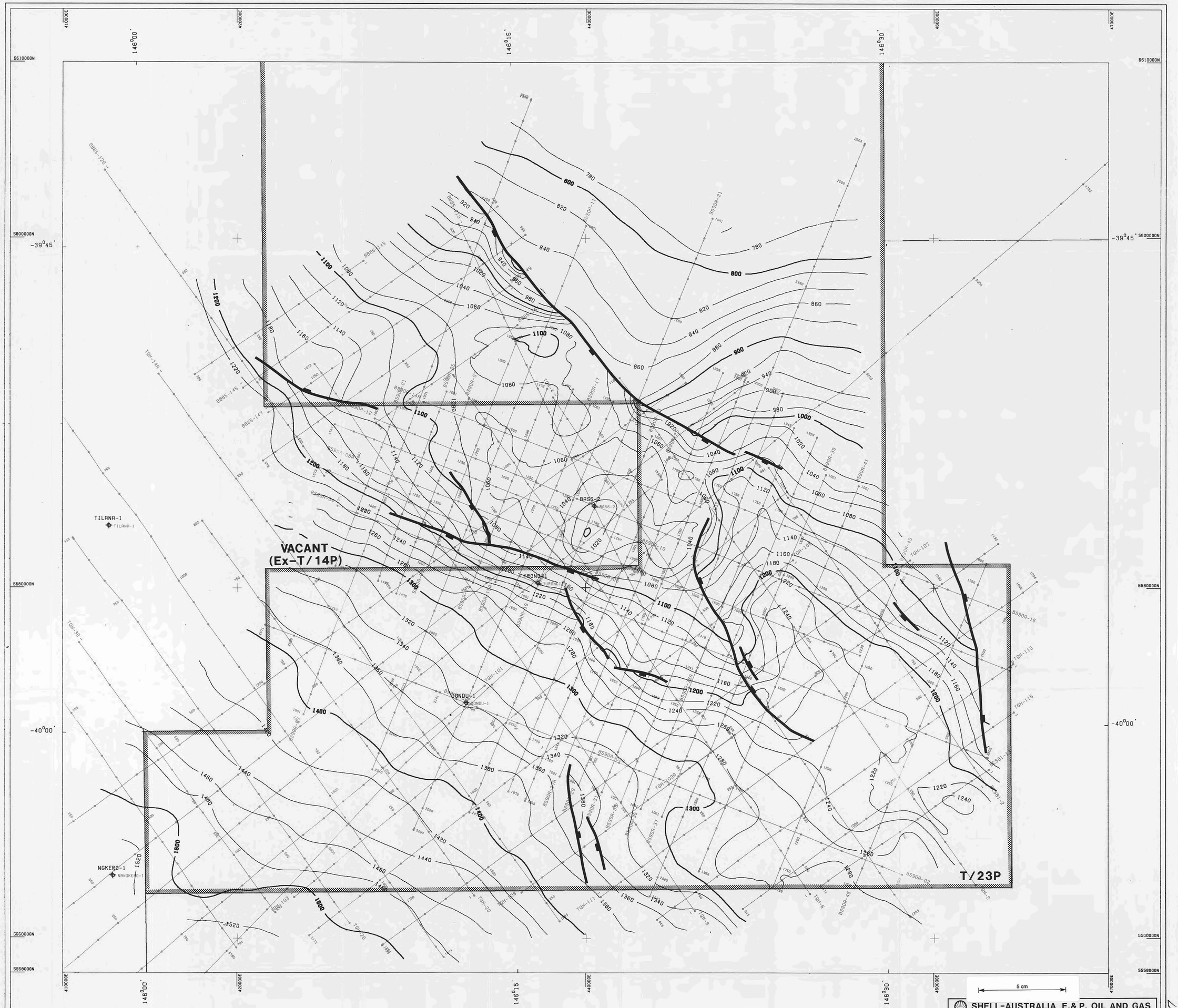
248020

LOWER INTRA-TORQUAY GROUP EVENT

TIME STRUCTURE MAP

Author : EXO	Date : MARCH 1992	Encl. 5
Report No. : SDA 1043	Drawing No. : 27753	

TPR OR-0247



SHELL-AUSTRALIA E.& P. OIL AND GAS

BASS BASIN

TOP DEMONS BLUFF FORMATION

TIME STRUCTURE MAP

248021

Author : EXO	Date : MARCH 1992	Encl.6
Report No. : SDA 1043	Drawing No. : 27755	

TAR OR-02447

SHALLOW

BASEMENT

VACANT
(Ex-T/14P)

T/23P

TILANA-1

YRONDA-1

BONDUA-1

NGKERO-1

0 5 10km

C.I.=20ms

5 cm

SHELL-AUSTRALIA E.& P. OIL AND GAS

BASS BASIN

TOP EASTERN VIEW GROUP

TIME STRUCTURE MAP

248022

Author : EXO	Date : MARCH 1992	Encl. 7
Report No. : SDA 1043	Drawing No. : 27751	

TPR 02-0247

SHALLOW

BASEMENT

VACANT
(Ex-T/14P)

T/23P

TILANA-1

NGKERO-1

YONGA-1

BANDU-1

5610000N
5600000N
5590000N
5580000N
5570000N
5560000N

410000E
420000E
440000E
460000E
470000E

146°00'
146°15'
146°30'
-39°45'
-40°00'

0 5 10km

C.I.=20ms

5 cm

SHELL-AUSTRALIA E.& P. OIL AND GAS

BASS BASIN

MID M. DIVERSUS UNCONFORMITY
TIME STRUCTURE MAP

248023

Author : EXO	Date : MARCH 1992	Encl. 8
Report No. :SDA 1043	Drawing No. : 27757	

TAR OR. 0247

SHALLOW

BASEMENT

VACANT
(Ex-T/14P)

T/23P

TILANA-1

NGKERO-1

BASS-2

GONDOLA-1

Untested Potential

0 5 10km

C.I.=20m

5 cm

SHELL-AUSTRALIA E.& P. OIL AND GAS

BASS BASIN

TOP EASTERN VIEW GROUP

DEPTH STRUCTURE MAP

248024

Author : EXO	Date : MARCH 1992	Encl. 9
Report No. : SDA 1043	Drawing No. : 27756	

TRR 92.0247

SHALLOW

BASEMENT

VACANT
(Ex-T/14P)

T/23P

TILANA-1

NOKERO-1

Untested Potential

0 5 10km

C.I.=20m

5 cm

SHELL-AUSTRALIA E.& P. OIL AND GAS

BASS BASIN

MID M. DIVERSUS UNCONFORMITY

DEPTH STRUCTURE MAP

248025

Author : EXO	Date : MARCH 1992	Encl.10
Report No. :SDA 1043	Drawing No. : 27750	

TPR OR-0247